

Description of *Melanotaenia salawati*, a new species of rainbowfish (Melanotaeniidae) from Salawati Island, West Papua, Indonesia

by

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ABSTRACT. - *Melanotaenia salawati* n. sp. is described from 16 specimens collected at Salawati Island in the Raja Ampat Group lying immediately west of the Bird's Head Peninsula in West Papua (Indonesia). *Melanotaenia salawati* is allied to *M. batanta* and *M. fredericki*. *Melanotaenia batanta* occurs in the central part of Batanta, an island just north of Salawati while *M. fredericki* is found on the westernmost portion of the Bird's Head Peninsula. The trio have a similar general body shape and lack pronounced sexual dimorphism. *Melanotaenia salawati* is distinguished from *M. batanta* by a shorter snout, a longer caudal peduncle, a longer dorsal-fin base, a longer second dorsal-fin base and more cheek scales. The new species differs from *M. fredericki* by a longer snout, a larger interorbital region, a shorter spine on second dorsal fin, a longer anal-fin base, more cheek scales and more gillrakers on the first branchial arch.

RÉSUMÉ. - Description de *Melanotaenia salawati*, une nouvelle espèce de poisson arc-en-ciel (Melanotaeniidae) de l'île de Salawati en Papouasie occidentale, Indonésie.

Melanotaenia salawati n. sp. est décrite à partir de 16 spécimens collectés sur l'île de Salawati dans l'archipel des Raja Ampat situé à l'extrémité ouest de la Péninsule de la Tête d'Oiseau en Papouasie Occidentale (Indonésie). *Melanotaenia salawati* présente des affinités avec *M. batanta* et *M. fredericki*. *Melanotaenia batanta* est endémique de la région centrale de Batanta, une île située juste au nord de Salawati alors que *M. fredericki* est confinée à l'extrémité ouest de la péninsule de la Tête d'Oiseau. Les trois espèces sont morphologiquement proches et se caractérisent par une absence de dimorphisme sexuel. *Melanotaenia salawati* se distingue de *M. batanta* par un museau plus court, un pédoncule caudal plus long, une base plus longue de la première nageoire dorsale et de la seconde, et un plus grand nombre d'écailles jugales. La nouvelle espèce diffère de *M. fredericki* par un museau plus long, un os interorbital plus large, un premier rayon épineux plus court sur la deuxième nageoire dorsale, une nageoire anale plus longue à sa base, un nombre plus important d'écailles jugales et plus de branchiospines sur le premier arc branchial.

Key words. - Melanotaeniidae - *Melanotaenia salawati* - West Papua - Indonesia - New species.

Rainbowfishes of the family Melanotaeniidae are common inhabitants of freshwaters of Australia and New Guinea. They have colonized a wide range of habitats from arid-zones to rainforests and below elevations of 1500 m. These various habitats consist of streams, lakes, swamps and isolated rocky pools (Allen, 1991). Rainbowfishes are very popular ornamental fish because of their vivid colouration, placid nature and ability to thrive in captivity. They are generalist omnivores, feeding on algae as well as on aquatic and terrestrial insects and small crustaceans (Coates, 1990; Arthington, 1992; Allen 1995; Pusey *et al.*, 1995).

Melanotaeniids belong to the order Atheriniformes (Nelson, 2006) and are believed to have evolved from ancestral marine atherinoids in relatively recent times (Allen, 1980). They are considered to be the sister-group of Pseudomugilidae from freshwaters of Australia and New Guinea (Saeed *et al.*, 1989; Sparks and Smith, 2004).

Seven genera are currently recognized within Melanotaeniidae (Allen *et al.*, 2008). Five genera are represented on the large island of New Guinea and on the surrounding islands of Batanta, Misool, Salawati, Waigeo, Yapen and Aru Islands. Those are: *Chilatherina* Regan, 1914; *Glossolepis* Weber, 1907; *Iriatherina* Meinken, 1974; *Melanotaenia* Gill, 1862; and *Pelangia* Allen, 1998. The genus *Melanotaenia* is by far the most diverse with 38 species described in New Guinea (Allen and Cross, 1980, 1982; Allen, 1991, 1996a, 1996b; Allen and Renyaan, 1996, 1998; Allen and Unmack, 2008; Allen *et al.*, 2008; Kadarusman *et al.*, 2010).

The Bird's Head region (including the Bomberai Peninsula and the nearby Raja Ampat Islands) is a centre of diversity for species of *Melanotaenia* (Allen, 1995; McGuigan *et al.*, 2000; Allen *et al.*, 2008). Currently, 14 species have been described from this region: *Melanotaenia ajamaruensis* Allen & Cross, 1980; *M. ammeri* Allen *et al.*, 2008;

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M. angfa Allen, 1990; *M. arfakensis* Allen, 1990; *M. batanta* Allen & Renyaan, 1996; *M. boesemani* Allen & Cross, 1980; *M. catherinae* (de Beaufort, 1919); *M. fasinensis* Kadarusman *et al.*, 2010; *M. fredericki* (Fowler, 1939); *M. irianjaya* Allen, 1985; *M. kokasensis* Allen *et al.*, 2008; *M. misoolensis* Allen, 1982; *M. parva*, Allen, 1990; and *M. synergos* Allen & Unmack, 2008.

The present paper describes a new species of *Melanotaenia* that was collected on the Island of Salawati (Raja Ampat Islands) during an ichthyological survey in 2008 (dark circle, Fig. 1).

This research is part of an international research program aiming to characterise and to domesticate Indonesian rainbowfishes. Several scientific expeditions have been undertaken since 2007 by the Institut de Recherche pour le Développement Montpellier, France (IRD), the Akademi Perikanan Sorong, Indonesia (APSOR-KKP) and the Balai Riset Budidaya Ikan Hias in Depok, Indonesia (BRBIH-KKP).

MATERIAL AND METHODS

Specimens of the new species are deposited at the Museum Zoologicum Bogoriense (MZB), the Naturalis Museum in Leiden (RMNH) and the Musée national d'Histoire naturelle de Paris (MNHN).

The methods of counting and measuring are derived from Allen and Cross (1980) with some modifications and additions (Kadarusman *et al.*, 2010). Measurements were taken with digital dial callipers under lightening monocular lens (x2) and counts were made under lightening bin-

ocular lens (x4). Measurements were taken on the left side and are expressed to the nearest 0.1 mm. All proportions are expressed as percentage of the standard length.

Counts. - Lateral scales are the number of scales in horizontal row from the upper corner of the gill cover to the caudal-fin base, excluding the small scales posterior to the hypural junction. Transverse scales are the number of scales in vertical row between the base of the first dorsal fin and the base of the anal fin origin. Predorsal scales are the number of scales along the midline of the nape in front of the first dorsal fin. Cheek scale is the total number of scales covering the suborbital and preoperculum. Dorsal rays are the number of spines in the first dorsal fin and the spine and soft rays in second dorsal fin. Anal rays are the single spine and number of soft rays. The last soft ray of the anal and second dorsal fins is divided at the base and counted as a single ray. Pectoral rays are the total number of segmented rays. Pelvic rays are the single spine and number of soft rays. Gillrakers are the total number on the first branchial arch.

Measurements. - Standard length is measured from the anteriormost tip of the upper lip to the posteriormost point of the hypural fold formed when the caudal peduncle is bent. Head length is measured from the tip of the upper lip to the upper rear edge of the gill opening. Snout length is the least distance measured from the tip of the upper lip to the fleshy anterior border of the eye. Interorbital width is the least width between the eyes anteriorly to the suture between frontal and nasal bones. Eye diameter is the maximal horizontal width of the orbital cavity. Body depth is measured from the base of the first dorsal spine to the base of the first anal spine. Body width is the maximal width measured posteriorly just behind

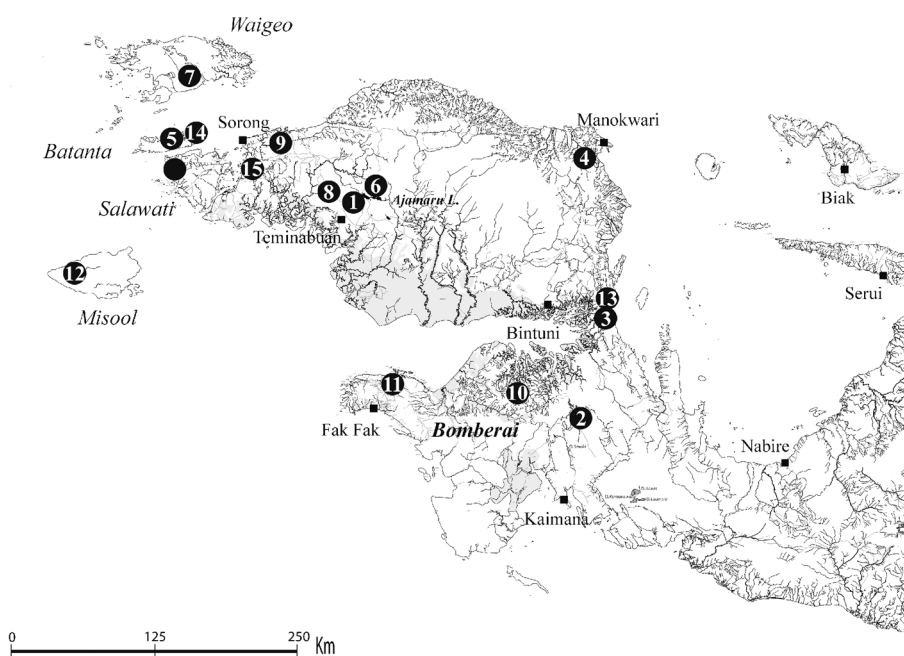


Figure 1. - Type locality of *Melanotaenia salawati* (black circle) and all stations (1-15) sampled for the nominal species on Bird's Head Peninsula and Raja Ampat.

the pectoral-fin base. Caudal peduncle depth is the minimum depth. Caudal peduncle length is measured from the base of the last dorsal fin ray to the vertebral-hypural junction at the caudal-fin base. Predorsal length is measured from the tip of the upper lip to the base of the spine at the origin of first dorsal fin. Prepelvic length is measured from the tip of the upper lip to the base of the spine at the origin of pelvic fin. Preanal length is measured from the tip of the upper lip to the base of the spine at the origin of anal fin. Pectoral fin length is measured from the anteriormost part of pectoral-fin base to the tip of the longest soft ray. Pelvic fin length is measured from the anteriormost part of pelvic-fin base to the tip of the longest soft ray. Spine length of the first dorsal fin is measured from the base to the tip of the first spine on the first dorsal fin. Spine length of the second dorsal fin is measured from the base to the tip of the spine on the second dorsal fin. Spine length of the anal fin is measured from the base to the tip of the single anal spine. Dorsal-fin base length is measured from the posterior base of the first spine of first dorsal fin to the posterior base of last soft ray of second dorsal fin. Second dorsal-fin base length is measured on the second dorsal fin from the posterior base of the first spine to the posterior base of last soft ray. Anal-fin base length is measured from the posterior base of the spine to the posterior base of the last soft ray.

Comparative material

The comparative material included all fourteen nominal species described from the Bird's Head Peninsula (including Bomberai Peninsula) and nearby Raja Ampat Islands (namely Waigeo, Batanta, Salawati and Misool). This material includes types specimens and additional specimens caught at or near the type localities during two surveys (2007-2008). These additional specimens were deposited at MZB, RMNH and MNHN. Their geographic locations are presented on figure 1.

Melanotaenia ajamaruensis. - Indonesia, West Papua. RMNH 28068 (holotype), 77.9 mm SL, Ajamaru Lakes; RMNH 28069 (paratypes), 3 specimens (57.5-63.8 mm SL), same data as holotype; RMNH 28070 (paratypes), 3 spms (57.4-62.4 mm SL), same data as holotype; RMNH 28071 (paratypes), 57.0 mm SL, same data as holotype; MZB 17692-93-94, 16 spms (62.5-96.5 mm SL) and MNHN 2009-1617, 6 spms (55.5-66.5 mm SL), River Kaliwensi, Soroang Village, about 5 km W of Lake Ayamaru (site 1: 1°15.073'S, 132°08.156'E).

Melanotaenia ammeri. - Indonesia, West Papua. MZB 16455 (holotype), 82 mm SL; Gusimawa, Arguni Bay; MZB 16456 (paratypes), 4 spms (55.9-71.0 mm SL), same data as holotype (site 2: 3°02.438'S, 133°52.844'E).

Melanotaenia angfa. - Indonesia, West Papua. MZB 17698, 3 spms (69.2-86.2 mm SL), MNHN 2009-1620, 5 spms (62.1-68.6 mm SL), RMNH.PISC.35675, 5 spms (59.5-62.6 mm SL), Pondok Creek, type locality, River Yakati (site 3: 2°11.067'S,

134°05.584'E; Fig. 7).

Melanotaenia arfakensis. - Indonesia, West Papua. MZB 17702, 3 spms (68.7-76.9 mm SL), MNHN 2009-1622, 4 spms (60.7-70.6 mm SL), RMNH.PISC.35677, 3 spms (60.9-71.3 mm SL), Supsan Creek, type locality, Prafi River (site 4: 0°58.376'S, 133°54.964'E).

Melanotaenia batanta. - Indonesia, West Papua. MZB 17705, 2 spms (91.2-99.2 mm SL), MZB 17706, 3 spms (88.2-95.4 mm SL), MNHN 2009-1625, 5 spms (79.5-107.9 mm SL), RMNH.PISC.35678, 5 spms (73.9-110.0 mm SL), Warmon Creek, type locality, Batanta Island, Raja Ampat (site 5: 0°50.256'S, 130°43.287'E; Fig. 4).

Melanotaenia boesemani. - Indonesia, West Papua. RMNH 28061 (holotype), 67.2 mm SL, Ajamaru Lakes; RMNH 28067 (paratypes), 2 spms (63.8-86.9 mm SL), same data as holotype; MZB 17691, 6 spms (54.7-60.7 mm SL), MNHN 2009-1616, 4 spms (61.8-66.0 mm SL), Tiwit Creek, Ayamaru Lake (site 6: 1°15.463'S, 132°14.939'E).

Melanotaenia catherinae. - Indonesia, West Papua. MZB 17703, 4 spms (65.4-79.8 mm SL), MNHN 2009-1623, 4 spms (58.1-67.1 mm SL), Waiwo Creek, Waigeo Island, Raja Ampat (site 7: 0°25.060'S, 130°46.462'E).

Melanotaenia fasinensis. - Indonesia, West Papua. MZB 17700 (holotype), 108.6 mm SL, Ween village, Fasin Creek, a tributary of Kladuk River, 25 km west from Ayamaru Lakes; MZB 17701 (paratypes), 4 spms (91.0-120.2 mm SL), MNHN 2009-1627, 4 spms (77.1-90.8 mm SL), RMNH.PISC.35680, 4 spms (69.9-78.5 mm SL), same data as for holotype (site 8: 1°13.856'S, 131°58.186'E).

Melanotaenia fredericki. - Indonesia, West Papua. MZB 17695, 4 spms (65.0-71.9 mm SL), RMNH.PISC.35673, 4 spms (65.0-81.5 mm SL), MNHN 2009-1618, 4 spms (55.7-71.1 mm SL), Samson River, type locality (site 9: 0°49.361'S, 131°24.193'E; Fig. 5). MZB 17714, 15 spms (49.8-71.1 mm SL), a small creek flowing to the strait of Sele on the road to Teminabuan, around 14 km south of Sorong (site 15: 1°0.467'S, 131°23.514'E).

Melanotaenia irianjaya. - Indonesia, West Papua. MZB 4952 (holotype), 58.8 mm SL, Fruata; MZB 4953 (paratypes), 3 spms (39.6-57.8 mm SL), same data as holotype; MZB 17696-17697, 6 spms (65.4-93.2 mm SL), MNHN 2009-1619, 4 spms (65.6-76.5 mm SL) and RMNH.PISC.35674, 4 spms (59.0-64.1 mm SL), Padang Creek, near Fruata (site 10: 2°34.691'S, 133°08.973'E).

Melanotaenia kokasensis. - Indonesia, West Papua. MZB 16453 (holotype), 57.2 mm SL, Kokas; MZB 16454 (paratypes), 2 spms (49.1-53.7 mm SL), same data as holotype (site 11: 2°42.185'S, 132°25.697'E).

Melanotaenia misoolensis. - Indonesia, West Papua. MZB 17707, 3 spms (59.8-77.4 mm SL), MNHN 2009-1626, 4 spms (54.0-58.4 mm SL) and RMNH.PISC.35679, 3 spms (46.1-48.9 mm SL), Wai Tama River, type locality (site 12: 1°50.978'S, 129°54.654'E).

Melanotaenia parva. - Indonesia, West Papua. MZB 17699, 2 spms (65.4-67.0 mm SL), MNHN 2009-1621, 3 spms (57.7-62.0 mm SL) and RMNH.PISC.35676, 3 spms (50.7-58.6 mm SL),

Lake Kurumoi, type locality (site 13: 2°09.761'S, 134°05.155'E; Fig. 6).

Melanotaenia synergos. - Indonesia, West Papua. MZB 17704, 2 spms (61.8-67.1 mm SL) and MNHN 2009-1624, 3 spms (57.7-63.5 mm SL), northern coast in western part of Batanta Island, less than 3 km from type locality (site 14: 0°50.288'S, 130°47.227'E).

RESULTS

Melanotaenia salawati, sp. nov.

(Figs 2, 3, Tab. I)

Material examined

Holotype. - MZB 17710, male, 88.7 mm SL, 1°1.128'S, 130°41.407'E, near Waipule village, Doktor Creek, Salawati Island, Raja Ampat, Papua Barat, Indonesia. Sumanta, A. Ajambua, J. Slembrouck, L. Pouyaud, 29 Apr. 2008.

Paratypes. - MZB 17711, 5 spms (71.4 -91.6 mm SL); MNHN 2010-0030, 5 spms (68.0-83.6 mm SL); RMNH. PISC.35875, 5 spms (77.1-82.2 mm SL); same data as for holotype.

Diagnosis

Melanotaenia salawati is distinguished from all of its congeners present on the Bird's Head Peninsula and Raja Ampat Islands by the combination of the following characters: Dorsal rays V to VI-I, 12 to 14; anal rays I, 25-28; lateral scales 36-37; transverse scales 10-11; predorsal scales 17-20; cheek scales 16-20; gillrakers 17-18; a short head length, 23.9-25.1% of standard length; a moderately long snout length, 8.5-9.1% of SL; a relatively large interorbital width, 8.6-9.2% of SL; a moderately small eye diameter, 6.9-7.9% of SL; a quite long and deep caudal peduncle (its length, 15.7-16.7 and depth, 11.0-12.6% of SL); a long predorsal length, 51.4-54.8% of SL, a short dorsal-fin base with total length, 33.7-36.1% of SL and second dorsal-fin base length, 19.7-22.3% of SL; a short prepelvic length, 34.5-37.2% of SL; a short preanal length, 44.2-48.1% of SL and a long anal-fin base length, 43.9-48.3% of SL; a long pectoral



Figure 2. - *Melanotaenia salawati*, MZB 17710 (holotype), male, 88.7 mm SL, near Waipule, Doktor Creek, Salawati, West Papua, Indonesia.

Figure 3. - *Melanotaenia salawati*, RMNH.PISC.35875 (paratype), female, 82.2 mm SL, same data as for holotype.

Figure 4. - *Melanotaenia batanta*, MZB 17705, male, 99.2 mm SL, Warmon Creek, Batanta, West Papua, Indonesia.

Figure 5. - *Melanotaenia fredericki*, MZB 17695, male, 71.9 mm SL, Samson River, West Papua, Indonesia.

Figure 6. - *Melanotaenia parva*, MZB 17699, male, 67.0 mm SL, Kurumoi Lake, Yakati River, West Papua, Indonesia.

Figure 7. - *Melanotaenia angfa*, male, 86.2 mm SL, Pondok Creek, Yakati River, West Papua, Indonesia.

Photos: L. Pouyaud.



Figure 8. - Type locality of *Melanotaenia salawati*, Doktor River, near Waipule, Salawati, Raja Ampat, West Papua, Indonesia (Photo L. Pouyaud).

fin length, 20.2-22.5% of SL and a moderately long pelvic fin length, 18.5-22.0% of SL.

Description

Counts and proportions that appear in parentheses refer to the range for paratypes (based on 15 specimens, 68.0-

91.6 mm SL) if different from the holotype. Morphometric data are given in table I.

Dorsal rays V-I,13 (V to VI,12-14); anal rays I,26 (I,25-28); pectoral rays 14 (14-16); pelvic rays I,5; branched caudal rays 17; lateral scales 36 (36-37); transverse scales 10 (10-11); predorsal scales 19 (17-20); cheek scales 20 (16-20); total gillrakers on first arch 17 (17-18).

Snout pointed, its length about equal to interorbital width and larger than eye diameter; jaws about equal, oblique, premaxilla with an abrupt bend between the anterior horizontal portion and lateral part; maxilla ends at level of front border of eye; lips thin; teeth conical with slightly curved tips, arranged in dense bands in upper and lower jaws; teeth at front of upper jaw in about 5-6 irregular rows, reduced to 1 or 2 rows posteriorly; teeth of upper jaw and middle portion of lower jaw extending outside of mouth onto lip; teeth at front of lower jaw in about 7-8 irregular rows, reduced to 2 rows posteriorly; a narrow patch of small and conical teeth on vomer; palatines edentate.

Scales of body cycloid, large, and arranged in regular horizontal rows; most of body scales with slight crenulations along posterior margin; predorsal scales extending to posterior half of interorbital; preopercle scales from posterior angle to edge of eye arranged in 3 (3-4) rows.

First dorsal fin originates behind anal fin origin, between base of fifth to seventh anal soft ray; tip of first dorsal fin when depressed, reaching base of second to fourth soft ray of sec-

Table I. - Measurements taken on the holotype and 15 paratypes of *Melanotaenia salawati* sp. nov.

	Holotype	Paratypes				
SL (mm)	88.7	68.0 - 91.6				
in % standard length		n	min	max	mean	SD
Head length	24.5	15	23.9	25.1	24.7	0.4
Snout length	8.8	15	8.5	9.1	8.8	0.2
Interorbital width	8.8	15	8.6	9.2	8.9	0.2
Eye diameter	7.2	15	6.9	7.9	7.5	0.3
Body depth	35.1	15	32.1	37.9	34.3	1.6
Body width	13.2	15	12.5	13.7	13.3	0.3
Caudal peduncle depth	12.1	15	11.0	12.6	11.9	0.5
Caudal peduncle length	15.9	15	15.7	16.7	16.2	0.3
Predorsal length	53.2	15	51.4	54.8	52.2	0.9
Prepelvic length	35.8	15	34.5	37.2	35.9	0.6
Preal anal length	46.0	15	44.2	48.1	46.3	1.1
Pectoral fin length	20.5	12	20.2	22.5	21.5	0.7
Pelvic fin length	20.7	14	18.5	22.0	20.4	1.1
Spine length of first dorsal fin	10.8	13	9.5	12.2	10.7	0.7
Spine length of second dorsal fin	10.2	14	8.6	11.7	10.2	1.1
Spine length of anal fin	8.5	14	7.4	9.7	8.7	0.7
Dorsal-fin base length	34.6	15	33.7	36.1	35.1	0.7
Second dorsal-fin base length	20.3	15	19.7	22.3	21.0	0.9
Anal-fin base length	45.5	15	43.9	48.3	45.6	1.3

ond dorsal fin; tip of second dorsal fin reaching 2/3 length of caudal peduncle; pelvic fin tips when depressed reaching base of fourth to sixth soft anal ray; soft dorsal and anal fins somewhat rectangular in outline, longest anterior rays with length decreasing progressively posteriorly; pectoral fins pointed; caudal fin moderately forked with moderately pointed extremities.

Colour of mature male when fresh including holotype (Fig. 2): azure blue dorsally; body scales with narrow dark outline; lower half of side of body and belly whitish to pale blue neon with oblong blue blotch extending from just below pectoral-fin base to above middle of anal fin; a narrow gold stripe between each horizontal scale row on upper half of body side; a diffuse dark blotch immediately behind eye on uppermost part of operculum; a diffuse dark midlateral stripe about one scale wide anteriorly and about three scales wide on caudal peduncle; presence of 2-3 diffuse narrow bars in middle part of the body extending ventrally from midlateral stripe; pectoral fin translucent with some melanophores between rays; remaining fins with golden tint increasing from the base to the tip. Overall colour of females (Fig. 3) is similar but paler than males.

Sexual dimorphism: Excepting for the coloration, which is less intense for the female, there appears to be little differences between male and female. Males lack the pronounced depth of the body and the elongation of the posterior dorsal and anal fin rays. This is an unusual feature for *Melanotaenia* because males are generally deeper bodied than females and have a more elongate and pointed shape posteriorly on the soft dorsal and anal fins (Allen *et al.*, 2008).

Comparisons

Melanotaenia salawati is allied to *M. batanta* and *M. fredericki*. *Melanotaenia batanta* (Fig. 4) occurs in the central part of Batanta, an island just north of Salawati Island. *Melanotaenia salawati* was previously reported as *M. fredericki* by Allen and Renyaan (1998). Fowler (1939) described *M. fredericki* on the basis of six very small (22-28 mm SL) juveniles from Sainkedoek on the Samson River. Fowler's *Charisella fredericki*, as it was originally named was placed by Allen and Cross (1982) as a synonym of *Melanotaenia goldiei*. However, in 1989, G.R. Allen collected adult specimens from a new locality at 14 km in the south vicinity of Sorong and confirmed the validity of *M. fredericki* (Allen, 1990). The 23 specimens stored at MZB were lost. We therefore obtained new adult specimens from the Samson River (type locality) and also from the creek visited by Allen in 1989 at 14 km south of Sorong. The identity of *M. fredericki* (Fig. 5) is now clearly understood and is restricted to the westernmost portion of the Bird's Head Peninsula.

The trio have a similar general body shape and lack pronounced sexual dimorphism. *Melanotaenia salawati* is distinguished from *M. batanta* by the coloration of the dorsal

fins (absence of marked margin stripe versus present), by a shorter snout length (8.5-9.1 vs 9.2-9.5% SL), a longer caudal peduncle length (15.7-16.7 vs 14.1-15.5% SL), a shorter dorsal-fin base (33.7-36.1 vs 36.3-39.2% SL), a shorter second dorsal-fin base (19.7-22.3 vs 22.6-26.3% SL) and more cheek scales (16-20 vs 11-13). The new species differs from *M. fredericki* by a longer snout length (8.5-9.1 vs 7.7-8.4% SL), a larger interorbital width (8.6-9.2 vs 8.0-8.5% SL), a shorter spine length on second dorsal fin (8.6-11.7 vs 11.7-13.7% SL), a longer anal-fin base (43.9-48.3 vs 36.1-43.7% SL), more cheek scales (16-20 vs 11-15) and more gillrakers on first branchial arch (17-18 vs 13-16).

Melanotaenia salawati is easily distinguishable from the three remaining species present on Raja Ampat, namely *M. catherinae*, *M. synergos* and *M. misoolensis*, by the combination of the following characters: a shorter head length (23.9-25.1 vs 25.4-26.7% SL), a smaller eye diameter (6.9-7.9 vs 7.9-9.9% SL), a shorter prepelvic length (34.5-37.2 vs 37.9-40.4% SL), a shorter preanal length (44.2-48.1 vs 48.5-51.4% SL), a shorter dorsal-fin base (33.7-36.1 vs 37.3-41.1% SL) and a shorter second dorsal-fin base (19.7-22.3 vs 22.7-27.8% SL).

Melanotaenia boesemani and *M. ajamaruensis* share many morphological differences with the new species. Those are: a longer preanal length (49.4-57.6 vs 44.2-48.1% SL), shorter pelvic fins (13.8-18.2 vs 18.5-22.0% SL), a shorter anal-fin base (32.2-40.4 vs 43.9-48.3% SL), less transverse scales (7-8 vs 10-11) and less predorsal scales (13-16 vs 17-20).

Melanotaenia salawati differs from *Melanotaenia fasinensis* by more transverse scales (10-11 vs 9), a shorter snout length (8.5-9.1 vs 9.2-9.5% SL), a larger interorbital width (8.6-9.2 vs 7.6-8.2% SL), a deeper and longer caudal peduncle (its depth 11.0-12.6 vs 10.1-10.8 and length 15.7-16.7 vs 13.3-15.6% SL), a longer predorsal length (51.4-54.8 vs 48.1-49.8% SL), longer pectoral fins (20.2-22.5 vs 17.4-19.9% SL), a shorter dorsal-fin base (33.7-36.1 vs 39.0-42.2% SL), and a shorter second dorsal-fin base (19.7-22.3 vs 25.9-29.5% SL).

Compared to *M. parva* (Fig. 6) and *M. angfa* (Fig. 7), the new species has a shorter head length (23.9-25.1 vs 25.2-27.6% SL), a shorter preanal length (44.2-48.1 vs 49.4-53.3% SL), longer pectoral fins (20.2-22.5 vs 16.2-19.3% SL) and a longer anal-fin base (43.9-48.3 vs 33.1-40.0% SL).

The most obvious differences between the new species and *M. arfakensis* are a longer snout length (8.5-9.1 vs 7.6-8.2% SL), a longer predorsal length (51.4-54.8 vs 47.1-49.6% SL), longer pelvic fins (18.5-22.0 vs 15.0-17.5% SL), a shorter dorsal-fin base (33.7-36.1 vs 37.0-39.9% SL), a shorter second dorsal-fin base (19.7-22.3 vs 24.2-27.0% SL), a longer anal-fin base (43.9-48.3 vs 39.7-43.6% SL) and more gillrakers on first arch (17-18 vs 13-15).

Melanotaenia irianjaya, *M. ammeri*, *M. kokasensis* differ from the new species with a longer prepelvic length (37.5–40.6 vs 34.5–37.2% SL), a longer preanal length (48.5–53.3 vs 44.2–48.1% SL) and a shorter anal-fin base (36.4–43.5 vs 43.9–48.3% SL). *Melanotaenia irianjaya* can be also distinguished from *M. salawati* by a longer snout length (9.6–10.9 vs 8.5–9.1% SL), and longer spines respectively on first dorsal fin (12.2–14.0 vs 9.5–12.2% SL), on second dorsal fin (12.5–14.6 vs 8.6–11.7% SL) and on anal fin (9.8–12.1 vs 7.4–9.7% SL).

Key to the species of *Melanotaenia* from the Bird's Head and Raja Ampat Islands

- 1a: Dorsal fins with a prominent margin stripe (Fig. 4). 2
 1b: Dorsal fins without a margin stripe (Figs 2, 3, 5, 6, 7) 3
 2a: Transverse scale rows 7 or 8 4
 2b: Transverse scale rows 9 to 12 5
 3a: Caudal peduncle depth 13.5–14.9% SL. Interorbital width 9.7–10.4% SL 6
 3b: Caudal peduncle depth 9.3–13.4% SL. Interorbital width 8.0–9.5% SL 7
 4a: Head length 23.1–25.1% SL. Eye diameter 7.2–8.2% SL. Prepelvic length 36.3–39.5% SL. Dorsal-fin base length 38.6–43.5% SL *Melanotaenia ajamaruensis*
 4b: Head length 25.5–28.5% SL. Eye diameter 8.6–10.7% SL. Prepelvic length 40.0–42.0% SL. Dorsal-fin base length 33.5–37.4% SL *Melanotaenia boesemani*
 5a: Snout length 7.6–8.6% SL 8
 5b: Snout length 9.2–10.9% SL 9
 6a: Snout length 8.5–9.1% SL. Eye diameter 8.5–9.1% SL. Caudal peduncle length 14.3–15.5% SL. Predorsal length 49.6–51.0% SL. Spine length of the first dorsal spine 9.2–10.5% SL. *Melanotaenia catherinae*
 6b: Snout length 9.2–9.6% SL. Eye diameter 7.9–8.3% SL. Caudal peduncle length 15.8–18.2% SL. Predorsal length 47.5–49.5% SL. Spine length of the first dorsal spine 8.3–8.9% SL. *Melanotaenia synergos*
 7a: Midlateral stripe not continuous. Interrupted on middle of side and sometime faint on caudal peduncle (Figs 2, 3, 6) 10
 7b: Midlateral stripe continuous from pectoral region to caudal peduncle (Figs 5, 7) 11
 8a: Head length 23.9–25.3% SL. Body width 13.0–14.6% SL. Caudal peduncle depth 12.0–13.2% SL. Second dorsal-fin base length 24.2–27.0% SL. Anal-fin base length 39.7–43.6% SL. Gill-rakers 13–15 *Melanotaenia arfakensis*
 8b: Head length 25.9–26.7% SL. Body width 11.3–11.8% SL. Caudal peduncle depth 11.2–11.5% SL. Second dorsal-fin base length 21.0–23.1% SL. Anal-fin base length 37.4–37.9% SL. Gill-rakers 16–19 *Melanotaenia kokasensis*
 9a: Caudal peduncle depth 11.6–12.9% SL *Melanotaenia batanta*
 9b: Caudal peduncle depth 9.4–11.3% SL 12
 10a: Head length 23.9–25.1% SL. Eye diameter 6.9–7.9% SL. Prepelvic length 34.5–37.2% SL. Preanal length 44.2–48.1% SL. Anal-fin base length 43.9–48.3% SL. Predorsal scales 17–20. Cheek scales 16–20. Anal rays 25–28. *Melanotaenia salawati* n. sp.
 10b: Head length 25.3–27.6% SL. Eye diameter 7.9–9.9% SL. Prepelvic length 37.9–41.0% SL. Preanal length 48.5–53.3% SL. Anal-fin base length 33.1–42.1% SL. Predorsal scales 13–17. Cheek scales 9–16. Anal rays 19–25. 13
 11a: Midlateral stripe on side covering 1 scale row from pectoral to middle sections and 2–3 scale rows on caudal section (Fig. 5). Spine length of first dorsal fin 12.0–13.9% SL. Anal rays 26–30 *Melanotaenia fredericki*
 11b: Midlateral stripe on side covering 1 scale row over most of its length (Fig. 7). Spine length of first dorsal fin 8.7–12.0% SL. Anal rays 20–26 14
 12a: Snout length 9.6–10.9% SL. Interorbital width 8.8–9.4% SL. Predorsal length 50.0–51.7% SL. Preanal length 48.5–53.2% SL. Spine length of the second dorsal fin 12.5–14.6% SL. Spine length of the anal fin 9.8–12.1% SL. Dorsal-fin base length 34.2–37.9% SL. Second dorsal-fin base length 20.5–23.9% SL *Melanotaenia irianjaya*
 12b: Snout length 9.2–9.5% SL. Interorbital width 7.6–8.2% SL. Predorsal length 48.1–49.8% SL. Preanal length 45.6–48.4% SL. Spine length of the second dorsal fin 7.3–11.6% SL. Spine length of the anal fin 7.0–8.8% SL. Dorsal-fin base length 39.0–42.2% SL. Second dorsal-fin base length 25.9–29.5% SL. *Melanotaenia fasinensis*
 13a: Eye diameter 7.9–8.4% SL. Caudal peduncle depth 11.6–12.5% SL. Caudal peduncle length 16.8–19.4% SL. Spine length of the anal fin 7.1–8.9% SL. Anal-fin base length 33.1–38.2% SL. Lateral scales 37–38. Gillrakers 13–16. *Melanotaenia parva*
 13b: Eye diameter 8.4–9.9% SL. Caudal peduncle depth 10.7–11.3% SL. Caudal peduncle length 15.6–16.5% SL. Spine length of the anal fin 9.0–11.1% SL. Anal-fin base length 38.4–42.1% SL. Lateral scales 33–36. Gillrakers 16–19 *Melanotaenia misoolensis*
 14a: Caudal peduncle depth 11.6–13.4% SL. Pectoral fin length 19.1–21.1% SL. Spine length of the anal fin 9.4–9.7% SL *Melanotaenia ammeri*
 14b: Caudal peduncle depth 10.2–11.4% SL. Pectoral fin length 16.2–18.5% SL. Spine length of the anal fin 6.5–8.4% SL *Melanotaenia angfa*

Habitat and distribution

The new species is currently known only from the type locality (Figs 1, 8). Doktor Creek is a stream of 5–10 meter

width, on the north-western part of Salawati Island in the vicinity of Waipule village. The habitat consists of clear, shallow and fast flowing water over metamorphic gravel and pebble in dense forest. The name “doktor” was given by locals to the river (i.e., Kali Doktor) in allusion to the water properties known to treat superficial injuries.

Etymology

The species is named *salawati*, in reference to the type locality on the island of Salawati in the Raja Ampat Group lying immediately west of the Bird's Head (Vogelkop) Peninsula.

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REFERENCES

- ALLEN G.R., 1980. - A generic classification of the rainbowfishes (family Melanotaeniidae). *Rec. West. Aust. Mus.*, 8(3): 449-490.
- ALLEN G.R., 1990. - Les poissons arc-en-ciel (Melanotaeniidae) de la péninsule de Vogelkop, Irian Jaya, avec description de trois nouvelles espèces. *Rev. Fr. Aquariol.*, 16(4): 101-112.
- ALLEN G.R., 1991. - Field Guide to the Freshwater Fishes of New Guinea. 268 p. Publication No. 9. Christensen Research Institute.
- ALLEN G.R., 1995. - Rainbowfishes in Nature and the Aquarium. 180 p. Melle, Germany: Tetra-Verlag.
- ALLEN G.R., 1996a. - *Chilatherina pricei*, a new species of rainbowfish (Melanotaeniidae) from Irian Jaya. *Rev. Fr. Aquariol.*, 23(1-2): 5-8.
- ALLEN G.R., 1996b. - Two new species of rainbowfishes (Melanotaeniidae) from the Kikori River system, Papua New Guinea. *Rev. Fr. Aquariol.*, 23(1-2): 9-16.
- ALLEN G.R. & CROSS N.J., 1980. - Description of five new Rainbowfishes (Melanotaeniidae) from New Guinea. *Rec. West. Aust. Mus.*, 8(3): 377-396.
- ALLEN G.R. & CROSS N.J., 1982. - Rainbow Fishes of Australia and Papua New Guinea. 141 p. New Jersey, USA: TFH Publications, Inc.
- ALLEN G.R. & RENYAAN S.J., 1996. - Three new species of Rainbowfishes (Melanotaeniidae) from the Triton Lakes, Irian Jaya, New Guinea. *Aqua, Int. J. Ichthyol.*, 2(2): 13-24.
- ALLEN G.R. & RENYAAN S.J., 1998. - Three new species of Rainbowfishes (Melanotaeniidae) from Irian Jaya, Indonesia. *Aqua, Int. J. Ichthyol.*, 3(2): 69-80.
- ALLEN G.R. & UNMACK P.J., 2008. - A new species of rainbowfish (Melanotaeniidae: *Melanotaenia*), from Batanta Island, western New Guinea. *Aqua, Int. J. Ichthyol.*, 13(3-4): 109-120.
- ALLEN G.R., UNMACK P.J. & HADIATY R.K., 2008. - Two new species of Rainbowfishes (*Melanotaenia*: Melanotaeniidae), from, western New Guinea (Papua Barat Province, Indonesia). *Aqua, Int. J. Ichthyol.*, 14(4): 209-224.
- ARTHINGTON A.H., 1992. - Diets and trophic guild structure of freshwater fishes in Brisbane streams. *Proc. R. Soc. Queensl.*, 102: 31-47.
- COATES D., 1990. - Biology of the rainbowfish, *Glossolepis multisquamatus* (Melanotaeniidae), from the Sepik River floodplains, Papua New Guinea. *Environ. Biol. Fish.*, 29: 119-126.
- FOWLER H.W., 1939. - Zoological results of the Denison-Crockett South Pacific Expedition for the Academy of Natural Sciences of Philadelphia, 1937-1938. Part 3. The Fishes. *Proc. Acad. Nat. Sci. Philad.*, 91: 77-96.
- KADARUSMAN, SUDARTO, PARADIS E. & POUYAUD L., 2010. - Description of *Melanotaenia fasinensis*, a new species of rainbowfish (Melanotaeniidae) from West Papua, Indonesia with comments on the rediscovery of *M. ajamaruensis* and the endangered status of *M. parva*. *Cybium*, 34(2): 207-215.
- MCGUIGAN K., ZHU G., ALLEN G.R. & MORITZ C., 2000. - Phylogenetic relationships and historical biogeography of Melanotaeniid fishes in Australia and New Guinea. *Mar. Freshw. Res.*, 51: 713-723.
- NELSON J.S., 2006. - Fishes of the World. (4th edit.). 624 p. New York: John Wiley & Sons.
- PUSEY B.J., READ M.G. & ARTHINGTON A.H., 1995. - The feeding ecology of freshwater fishes in two rivers of the Australian wet tropics. *Environ. Biol. Fish.*, 43: 85-103.
- SAEED B., IVANTSOFF W. & ALLEN G.R., 1989. - Taxonomic revision of the family Pseudomugilidae (Order Atheriniformes). *Aust. J. Mar. Freshw. Res.*, 40: 719-787.
- SPARKS J.S. & SMITH W.L., 2004. - Phylogeny and biogeography of the Malagasy and Australasian rainbowfishes (Teleostei: Melanotaenioidei): Gondwanian vicariance and evolution in freshwater. *Mol. Phylogenet. Evol.*, 33: 719-734.

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